

FUNGI FROM KERGUELEN ISLAND.

BY D. McALPINE.

(Communicated by J. H. Maiden, F.L.S.)

(Plate XIII., figs. 1-8.)

Mr. Robert Hall, of Melbourne, paid a visit to this Island in December, 1897, and was there from December 27th, 1897, to February 18th, 1898, or a little over seven weeks altogether.

He sailed from Port Philip in the brig "Edward," commanded by Captain Steensohn, with a crew of 14 men on board. As the guest of Mr. Hans Gundersen, the owner, he had every facility for making the most of his trip as naturalist. While his principal object was to study the oceanic avifauna and collect ornithological specimens, he also made a general collection of natural history objects, which will, I understand, be properly described. The fungi collected by him were placed in my hands for determination by Mr. Luehmann, F.L.S., Curator of the National Herbarium, and I consider them of sufficient interest and novelty to be put on record.

Kerguelen Island, also known as Desolation Island and Antarctic Iceland, lies in the South Indian Ocean, midway between the Cape of Good Hope and Australia. Its long is between $68^{\circ} 42'$ and $70^{\circ} 35'$ E., and its lat. $48^{\circ} 39'$ and $49^{\circ} 44'$ S. It is about 90 miles long by 50 wide, and is composed principally of volcanic rock. The flora of such an oceanic island has a peculiar interest of its own in relation to geographical distribution, and even the fungi have to be taken into account in this connection.

Previous Collections of Fungi.—Five scientific expeditions have visited the Island within comparatively recent times—the

"Antarctic" under Sir James Ross (1840), the "Challenger" under Sir George Nares (1874), and three "Transit of Venus" Expeditions (1874-75),—and it is to them we owe our present scanty knowledge of the fungi of this island. In the Botany of the American Transit Expedition,* no fungi are recorded, and I have not seen the Report of the German Expedition to which Drs. Naumann and Huesker were attached as naturalists, but a list of all obtained by the others is given in the Transactions of the Royal Society, Vol. 168 (1879). Saccardo's "*Sylloge Fungorum*" has, however, been consulted, and probably all the known species are there recorded. Nine species have been described, distributed among seven genera.

Mr. Hall's Collection.—There are ten species of fungi represented altogether, exclusive of bacteria, distributed among as many genera, and all of them are determinable from the fairly good state of preservation in which they reached my hands. It is very creditable indeed to Mr. Hall that, after such distinguished naturalists as Sir Joseph Hooker, Moseley and Eaton had visited the island, he should have succeeded, not only in collecting several species unobserved by them, but in securing more species than the total number previously known.

It will be seen, on next page, that 5 are among the 9 previously recorded, and the remaining 5 are new to the island, two of them (*Panaeolus Hallii* and *Fusarium rhodellum*) being new to science. Of the 5 newly recorded, two of them at least are so cosmopolitan that they have probably been introduced by the sealers who occasionally visit the island, so that there are 3 to be added to the fungus-flora as indigenous species. The total number, therefore, of the fungi at present known is 14, of which three are very probably introductions.

In isolated islands, such as Kerguelen, it has been observed that the species are generally well defined, and that the genera are small, seldom containing more than two or three species. In the present collection each genus has only one species, and in

* Smithsonian Miscellaneous Collections, Vol. xii. Art. ii. 1878.

the general collection there are never more than two species to a genus.

The following table will show at a glance the fungi formerly recorded and those added to the list by Mr. Hall :—

Fungi already recorded and those recently collected at Kerguelen Island, principally between 27th December, 1897, and 30th January, 1898, by Mr. Robert Hall :—

FUNGI ALREADY RECORDED.

1. *Galera kerguelensis*, Berk.
2. *G. hypnorum*, Batsch.
3. *Tubaria furfuracea*, Pers.
4. *Naucoria glebarum*, Berk.
5. *Agaricus campestris*, L.
6. *Coprinus atramentarius*, Fr.
7. *C. tomentosus*, Fr.
8. *Lachnea (Peziza) kerguelensis*, Berk.
9. *Cladosporium herbarum*, Link.

HALL'S COLLECTION.

1. *Galera hypnorum*, Batsch.
2. *Naucoria glebarum*, Berk.
3. *Coprinus tomentosus*, Fr.
4. *Lachnea kerguelensis*, Berk.
5. *Cladosporium herbarum*, Link.
6. *Panaeolus Hallii*, n.sp.
7. *Aspergillus glaucus*, Link.
8. *Penicillium glaucum*, Link.
9. *Fusarium rhodellum*, n.sp.
10. *Alternaria tenuis*, Nees.
11. Bacteria.

GALERA HYPNORUM, Batsch.

(Plate XIII., fig. 1.)

Among moss. Gregarious. Spores elliptical, yellowish, $9\frac{1}{2}$ -11 \times $5\frac{1}{2}$ -6 μ .

Geog. Dist.—Europe, Asia, America, Australia, Beeren I., Jan Mayen I., Kerguelen I.

It differs from *G. kerguelensis*, Berk., in the stem being nearly $1\frac{1}{2}$ in. high, in the principal gills though distant being more numerous than 12, and in the pileus being rather membranaceous.

NAUCORIA GLEBARUM, Berk.

(Plate XIII., fig. 2.)

Gregarious. On damp ground among moss. Spores orange-yellow, elliptical to roughly ovate, $13-15 \times 7\frac{1}{2}-8\frac{1}{2} \mu$.

Geog. Dist.—Falkland Is., Kerguelen I.

COPRINUS TOMENTOSUS, Fr.

On damp ground among grass (Royal Sound. 27-xii.-97 to 20-i.-98). Gregarious. Pileus about $\frac{5}{8}$ in. high. Gills free, about $\frac{1}{8}$ in. broad. Stem up to $2\frac{1}{2}$ in. long. Spores black, elliptical, $13-15 \times 8\frac{1}{2}-9\frac{1}{2} \mu$.

Geog. Dist.—Europe, Asia (Ceylon), Australia, Kerguelen I.

LACHNEA KERGUELENSIS, Berk.

(Plate XIII., figs. 3-4.)

Gregarious, fleshy, sessile, at first cup-shaped, becoming expanded and gradually tapering towards base, $\frac{3}{16}$ inch across when dry, but about $\frac{1}{4}$ inch when fresh. Disc deep brick-red or clear light carmine, becoming lake when dry, blackening towards margin. Externally orange-yellow, densely clothed with short, brownish, flaccid hairs, which are yellowish to yellowish-brown by transmitted light; septate, acute at apex, narrowing towards base, up to 350μ long and 24μ broad. Asci cylindrical, rounded or flattened at apex, often bulging slightly at spore and contracted between. Spores elliptical to ellipsoid, smooth, obliquely uniseriate or partially straight, continuous, hyaline, 1-3-guttulate. $20-20\frac{1}{2} \times 16-17 \mu$. Greenish-yellow when treated with Potassium-iodide-iodine. Paraphyses filiform, septate, apex clavate and 7μ broad, rest about 3μ broad, slightly longer than asci, contents coloured similarly to that of spores by Potassium-iodide-iodine.

On the ground and on dead portions of *Azorella*. Greenland Harbour. Between 27th and 30th January, 1898.

Geog. Dist.—New Zealand and Kerguelen I.

Mr. Hall states that he was struck with the bright appearance of this fungus, like so many brick-red cups, and generally 8 or 10 together.

PANAEOLUS HALLII, n.sp.

(Plate XIII., figs. 5a, 5b, 6.)

Minute, about $\frac{7}{16}$ in. high. Pileus conical, buff-coloured, mealy, about $\frac{1}{4}$ in. high and $\frac{1}{8}$ in. across, with flattened apical disc somewhat darker coloured. Gills adnexed, greyish and mottled with black spores. Stem similarly coloured to pileus, mealy, hollow, tapering to a point at apex, slightly swollen and darker at base. Spores black, yellowish-brown by transmitted light, elliptical to oval, thick-walled, $11-15 \times 9-11 \mu$.

On damp ground among moss. About 28th January, 1898. South Head of Royal Sound.

Only a few specimens were met with, and they were not gregarious, but they might easily be overlooked on account of their small size. The mealy covering was very uniform over the whole.

On the decaying wood of the Kerguelen Island Cabbage (*Pringlea antiscorbutica*, Brown), which was considerably bored by the larvæ of the Cabbage Fly, I found four species of saprophytic fungi:—

1. *ASPERGILLUS GLAUCUS*, Link, generally overspreads the wood, forming masses of its glaucous heads of conidia. This species has not hitherto been recorded here, but in Hooker's "Flora Antarctica," *Eurotium herbariorum*, Link, of which *Aspergillus* is the conidial condition, is recorded on biscuit on board the "Erebus," Jan. 3rd, 1841. In this way the fungus may have been introduced, and it was the greenish hue of the wood which attracted Mr. Hall's attention and induced him to collect it.

2. *PENICILLIUM GLAUCUM*, Link, also occurs on the same piece of wood, at first forming a dense white stratum, then its sage-green conidia.

3. Intermixed with the *Aspergillus* are salmon-pink patches found to be due to a species of *Fusarium*.

FUSARIUM RHODELLUM, n.sp.

(Plate XIII., fig. 7.)

Forming an effused, salmon-pink, flocculent layer. Hyphæ hyaline, septate, branched, slender, densely interwoven, about $4\ \mu$ broad and conidiophores only $2\ \mu$. Conidia at tips of branches, hyaline, slightly curved and pointed at both ends, sometimes straight and fusiform, uni-septate when fully developed, $11-13 \times 2\ \mu$, but may be only $7\frac{1}{2}-9\frac{1}{2}\ \mu$ long when aseptate. Stained very pale yellow by Potassium-iodide-iodine.

It differs from *F. brassica*, Thuem., in the absence of wart-like brown sporodochia and the conidia not being bi-septate; from *F. roseum*, Link, in the conidia not being 3-septate.

4. A sooty-black mould was also developed on the same piece of wood among the others.

ALTERNARIA TENUIS, Nees.

(Plate XIII., fig. 8.)

Hyphæ pale fuliginous, short, septate, branched, average $4\ \mu$ broad. Conidia in chains, dark brown to dark olive, elongated, clavate, up to 6-septate and sparingly longitudinally septate, constricted at septa, some *Helminthosporium*-like, $24-37 \times 9-11\ \mu$.

It differs from *A. brassica*, Sacc., in the hyphæ being narrow and multi-septate and the conidia less than half the size. The conidia were sometimes firmly attached in chains, and three might frequently be seen tossing about in a current under the microscope without separating.

On leaf of *Pringlea antiscorbutica*. Black-looking spots with slightly raised margins, round to oval, and marked with concentric zones, up to $\frac{1}{2}$ inch diam.

The leaf was yellow, the only one on this particular cabbage, and probably connected in some way with the spots.

Nests of Bacteria were plentifully found, but no other form of fungus-fructification.

I submitted the leaf to Dr. Cherry, and his report is as follows:

Pathological Laboratory,
University of Melbourne,
22nd August, 1898.

Scrapings from the surface of the specimen of Kerguelen Island cabbage contain bodies which appear, from their morphological characters and staining reactions with the aniline dyes, to be micro-organisms. They are of two forms, cocci generally about 2μ in diameter, and bacilli 6μ long and 2μ in diameter. No growth has been obtained by inoculations on gelatine and potato kept for two months at from 8° to 15° C. These bodies occur both on the black spots and on the normal surface of the leaf.

T. CHERRY, M.D.

CLADOSPORIUM HERBARUM, Link, was found on the same leaf. Eaton also found the same fungus on dead stems.

BIBLIOGRAPHY.

The works relating to Kerguelen Island Fungi are not numerous, and their titles may be given here in full:—

- 1.—HOOKER, J. D. The Botany of the Antarctic Voyage of H.M. Discovery Ships "Erebus" and "Terror," in the years 1839-1843, under the Command of Captain Sir James Ross.

Part i. Flora Antarcticae, 1845-1847 (Fungi, by Rev. J. M. Berkeley).

- 2.—————. Botany of Kerguelen Island. *Phil. Trans. Roy. Soc.* Vol. 168, 1879. (Collections made during the Transit of Venus Expeditions, 1874-75, and Fungi named by Rev. J. M. Berkeley).

- 3.—Report of the Scientific Results of the Voyage of H.M.S. "Challenger" during 1875-76. Botany. Vol. i. (Fungi enumerated as in *Phil. Trans.* Vol. 168).

- 4.—Die Forschungsreise S.M.S. "Gazelle" in den Jahren 1874, bis 1876, unter Kommando des Kapitän zur See Freiherrn von Schleinitz, herausgegeben von dem Hydrographischen Amt des Reichs-Marine-Amt. Berlin, 1890.

Band. iv. Botanik, herausgegeben von A. Engler. Pilze, Baron von Thuemen.

- 5.—SACCARDO, P. A. Sylloge Fungorum. Vol. xii. Pt. i, Fasc. 2, 1897.

EXPLANATION OF FIGURES.

Plate XIII.

Galera hymnorum.

Fig. 1.—Spores ($\times 1000$).

Naucoria glebarum.

Fig. 2.—Spores ($\times 1000$).

Lachnea kerguelensis.

Fig. 3.—Ascus with spores ($\times 270$).

Fig. 4.—Apex of paraphysis ($\times 1000$).

Panaeolus hallii.

Fig. 5.—Specimen and section (nat. size).

Fig. 6.—Spores ($\times 1000$).

Fusarium rhodellum.

Fig. 7.—Conidia ($\times 1000$).

Alternaria tenuis.

Fig. 8.—Conidia ($\times 1000$).